

Failure Modes and Effects Analysis/Critical Items List

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 Title: Risk Assessment Executive Summary Report (RAESR) for the USA SAFER

Item Name: Battery Assembly Qty: 1 FMEA Number: US-SFR-460
 Item Part Number: SED33105907 ORU Name: SAFER
 Subsystem Name: Battery ORU Part Number: SED33105900-311
 Function: Battery pack supplies electrical power to SAFER.

Item Type Designator: C PG/IP Identifier: N/A
 Reference Designator/Find No.: N/A Drawing Number: SED33105907
 Logistics Control Number: N/A

End Item Name: SAFER
 End Item Capability: Six degrees of freedom through 24 thrusters, each rated at 0.8 ± 0.08 lbs. force in vacuum.
 End Item Function: Provides emergency EVA self-rescue for separated crewmember.
 ISS Zone: EVA Shuttle Zone: EVA

Criticality

Critical Item: Yes: _____ No: X Criticality Category: ISS: 1R Shuttle: 1R/3
 Success Paths: Success Paths Remaining:

Failure (Mode, Cause, Detection, Corrective Action)

Failure Mode: Battery assembly fails to provide power.
Failure Mode Code:
Failure Cause: Cell failure, open/short circuit, blown fuse, piece-part failure, depleted battery.
Failure Detection:
Flight: IVA – IVA checkout.
 EVA – No thrust response. No display.
Ground: Functional Test.
Time To Detect Quantity: 10 **Time To Detect Units:** Seconds
Correcting Action: IVA – If a failure or apparent bad battery indication is detected during the IVA checkout, the battery pack will be changed with a spare battery and re-tested. IF changing the battery has no effect on the failure, the back-up SAFER (if available) will be used.
 EVA – Cycle power. If not successful, no other corrective action.
Remarks: For battery leakage to cause the battery pack to fail to provide power, 6 cells (2 per string) would have to be leaking. A short to ground anywhere within SAFER would cause a blown fuse in the battery pack.
Failure Effect Phase: EVA Operations **Affected Stage(S):** EVA Operations

Failure Effect

On ORU/Assembly:
First/Second Failure: Inadvertent EVA crewmember separation.
Third (this) Failure: Unable to arrest previous motion.
On Subsystem/Next Assembly: None.
On End Item/Segment: Prevents self rescue. Possible loss of mission objectives if SAFER required for EVA.
On Crew/ISS: Possible loss of EVA crewmember/damage to EMU/Orbiter/ISS.
Time To Effect Quantity: 1 **Time To Effect Units:** Minutes

Redundancy Screen

ISS		(Shuttle)			
Checkout Pre-Launch	(A):	Pass			
Checkout On-Orbit	(B):	N/A			
Detection Flight Crew:		Pass	Or	Detection Ground Crew:	Fail
Loss Of Redundancy From A Single Cause	(C):	N/A			